



Factors Affecting Tendency towards Organic Production (Case Study: Greenhouse Producers of Tabriz Township, Iran)

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Abstract

The purpose of this survey was to research the major factors affecting the tendency of greenhouse producers towards organic production in Tabriz township, Iran. The statistical research population involves all greenhouse owners in Tabriz (N=70). The necessary data were collected using questionnaires, after that the validity and reliability of questionnaire was approved by the academic members of the scientific board, and its validity was justified through alpha Cronbach ($0.74 < \alpha < 0.83$). The results of the study indicated that the participant greenhouse owners showed positive attitude towards organic agriculture, and revealed high tendency towards producing organic greenhouse products. Moreover, the results of stepwise multiple regression indicated that, among the all investigated factors, the eight factors namely "Being notified over the negative outcomes of using chemical fertilizers and pesticides", "contact with agricultural extension agents and experts", "age of greenhouse owners", "participation in the organic educational-extension programs", "educational level", "attitude towards organic agriculture", "acquaintance with organic agriculture" and "the experience in the greenhouse production" can explain around 61% of the changes in the variance of the tendency of greenhouse producers for organic production.

Keywords:

Greenhouse Products, Organic Agriculture, Tabriz, Tendency

1. Introduction

For every country, the most essential and primary role perceived for agriculture is the production of food consumables required for its citizens. Although agriculture plays significant role in such important areas as employment, and supply of raw input materials for the export industry, yet its utmost goal and focus is considered to be the production of food products, and if successful in fulfilling this goal it can highly facilitate development of the country (Shafie et al. 2008). In this regards, attaining a sustainable agriculture system constitutes one of the most fundamental policies of agriculture sector of any country (MalekSaedi, 2010). Many agricultural, economic and environmental science experts believe that the current patterns of farming which demand irregular and excessive amounts of chemical inputs have neither provided food security nor protection of

environment, and therefore need to be replaced by an alternate system which is based on consumption of less external inputs, balanced utilization of resources, protection of environment as well as improvement of farming lands and water resources (Arabion et al. 2010). This however, is never in denial with the widespread remarkable efforts both done in the past and being exercised currently for the development of agriculture sector, but the necessity of changing the current patterns of farming in response to food security issues and protecting natural resources across the world is quite felt (Mahmoudi et al. 2008), more specifically in Iran which ranks as second after Australia with respect to the enormous volumes of soil erosion, as well as destruction of fertile lands and natural resources (Kashani 2001). In fact, the initial introduction of green revolution to Iran has been accompanied by the vast promotion of utilizing high yielding varieties, as well as chemical fertilizers and

pesticides, which in turn have caused lots of unpredicted problems, such as environmental wastes and damages, destruction of ecological habitats, increase in the volumes of agricultural product wastes, the wasteful usage of chemical fertilizers and pesticides, etc (Malekzadeh et al. 2010). In this regard, the organic agriculture as a class of sustainable farming has been considered as one of the approaches for reducing from the environmental issues and as a method for the sustainable development of agriculture and production of healthy food without any chemical agents (Sharma 2005, MalekSaeedi et al. 2010).

Based on various definitions most of which emphasize on none usage of chemical fertilizers and pesticides, organic agriculture is also called ecological agriculture (Gosling et al. 2006) or biodynamic agriculture (Lampkin 2002). During recent years, organic agriculture has widely expanded across the world, and was adopted by the European Union (EU) and Food and Agriculture Organization of the United Nations (FAO) as one of the alternative systems of farming to traditional agriculture (Polat et al. 2008). over 43.7 million hectares of land by 2.3 million producers across the world were cultivated through organic management, including in-conversion areas. This constitutes nearly 1% of total arable lands worldwide, showing a 0.3% increase compared to 13 years ago (Willer, 2011). Moreover, based on the global statistics (reported by The World of Organic Agriculture, 2014) Australia ranks the 1st with 17.2 million hectares of organic lands, and is followed by Argentina and United States with 3.1 and 2.2 million hectares respectively (Willer & Julia 2016). Among the factors turning organic agriculture into a global approach and boosting its rapid growth, involve the attention to ecology, protection of soil and environment, and being economical.

Numerous studies have been carried out by national and international researchers on the subject, some of which will be summarized here in:

In their study Norozi and Shahbazi(2010) concluded that agriculture in a sustainable and organic way, requires a comprehensive promotional system, and mark such system as one of the effective factors for the development of organic agriculture.

Results from a survey conducted by Bagheri and Shahpasand(2010) titled "Attitude of potato farmers of Ardabil terrestrial plain towards sustainable agricultural practices" revealed that potato farmers had a positive views towards general principles of sustainability and related operational practices such as the necessity of soil and water protection, negative effects of utilizing chemical agricultural inputs, attention to crop rotation, and the importance of safekeeping environment.

Ahmadvand (2008) showed that the low financial return, little knowledge of farmers about sustainable agricultures and the low education levels form the main barriers in adopting sustainable agriculture technologies and practices.

Ghorbani (2009) mentioned in his study providing of the cheap credits (subsidies) as one of the effective factors for adopting organic agriculture practices.

Baba akbari Sari et al (2008) pointed to the radio and television as the most important communication sources and channels, which play an effective role in the expansion of organic agriculture.

Omani (2001) in his study on determining social, economic and agricultural factors of wheat farmers adopting low input sustainable agriculture (LISA) practices, analyzed the relation between age, number of family members, distance of farmer's land from the center of agricultural services with the acceptance of LISA practices.

Tatlidil et al (2009) demonstrated that being in high contact with promotional services, education, land ownership, and extra access to information leads to the better appreciation of agricultural practices.

In their research Lund et al (2008) suggested economic incentives as the most important factors for the adoption of organic agriculture.

In a recent study, Djokoto et al (2016) suggested that the increased and effective extension and credit services could encourage farmers to adopt organic production.

Sanderson (2004) and Stobbelaar et al (2006) mention the awareness about the advantages of organic agriculture as one of the effective factors in embracing this system of agriculture.

Dabbert et al (2004) believe that agriculture supportive expenditures for organic farmers will play a key role in the process of adopting, maintaining and development of organic agriculture.

Diederer et al (2003) suggest land size as the most important factor in adopting organic agriculture. Epiphane et al (2015) concluded in their research, that farmers with homes close to their farm have more tendency towards organic farming compared to those living far their farm.

In this context, and according to the studies, despite the many promotional efforts and activities, yet few greenhouse owners have accepted to move towards the organic agriculture (Rezapanah, 2016), and due to the ignorance of negative side effects of chemical fertilizers and pesticides, plus the low levels of education among greenhouse owners across the country (specifically throughout the region of study), and the wrong management, ... high levels of fertilizers and pesticides are consumed in such a way that based on the collected data much exceed the

permitted as well as the world per capita levels (Ghadimi et al, 2015). This not only has caused soil erosion and created environmental issues in the nature of the studied region (Shiri, 2013), but has also generated many economic problems for the same greenhouse owners, who year after year are losing more of their export potentials for utilizing uncontrolled levels of chemical inputs, and once their products surplus the local market, are eventually discarded as agricultural wastes (Ghadimi et al, 2015). Therefore, production of organic agricultural crops and improvement of the related organic farming processes both in quantitative and qualitative ways, seem to be essential for Iran in general and for the studied region in particular. Due to its dense consumer population as well as the high numbers of greenhouse producers. In this regard, the main purpose of the current study is to determine the factors affecting the tendency of greenhouse owners towards organic production, and then to isolate those factors which effectively raise the tendency of greenhouse owners towards adopting organic production, which in turn can also be useful in identifying the factors affecting greenhouse owners in accepting organic farming and other new innovations. Moreover, identification of these factors highlights those parameters which can affect farmers' decisions, and thus may provide new means of presentation and promotion for the agriculture authorities and policy makers for the promotion of other new agricultural innovations and products.

2. Materials and methods

The main method adopted by this study is cross-sectional survey. Our statistical population consisted of all greenhouse producers operating in Tabriz, East Azerbaijan (N=70) that all of population was studied. The primary research tool was a questionnaire, draft of which was initially designed and given to several faculty academic members as well as three local experts as referees, so they could verify the questionnaire with respect to face validity and content validity.

In order to verify the reliability of the questionnaire, Cronbach's alpha score was calculated for 27 questionnaires in Uremia, West Azerbaijan, and desirable levels of scale were found as 0.74, up to 0.83. Data was then collected and processed using SPSS software package, and linear regression was utilized to analyze data.

3. Results and discussion

3.1 Demographic Characteristics

According to the statistics of Table (1), the average age of greenhouse owners was 38, and the average working experience among these greenhouse

owners was also 6 years which indicate the high value of greenhouse farming for the studied region. Based on the collected data as well as in-person interviews with greenhouse owners, the average area of the studied greenhouses estimates as 6989 square meters.

Table (2) reveal that 48% of greenhouse owners have formal educations at various levels, under high school diploma or even less, while 52% possess university degrees. Moreover, 43% of the respondents never had training in educational-promotional sessions related to organic agriculture and drawbacks of chemical inputs, and 57% had participated in such classes at least once.

The low levels of the greenhouse owners' earnings, due to a variety of production and income risks as well as the returned unsold products, has pushed greenhouse owners to engage in other occupations as well. In fact 40% of greenhouse owners stated that they had a secondary non-agriculture job, while 60% of the respondents told they had no other occupation except their own greenhouse business.

With respect to the irrigation system, 70% of the greenhouse owners utilized drip irrigation, while the remaining 30% employed rain irrigation method. A majority (60 percent) of the respondents had the private ownership of their greenhouse, while 25% of the greenhouses were operated as rented properties.

Regarding the criteria of using chemical fertilizers and pesticides, 39% of the greenhouse owners pointed out to their own criteria and knowhow, and 30% told that they made decisions by asking other greenhouse owners, whereas only 23% took decisions based on the instructions from experts.

Most of these greenhouse owners (52%) had a moderate view towards organic agriculture, while the views of 37% were good, and 11% regarded organic agriculture with a negative attitude.

Only 5% of the greenhouse owners were much highly informed and aware of organic agriculture, its advantages, principals and methods. Meanwhile, 13% had high, 26% had moderate, 26% had little, and 30% had very little information on organic agriculture, its advantages, principals and methods. This clearly reveals the lack of awareness among greenhouse owners on organic agriculture, its advantages, principals and methods.

3.2 Tendency of greenhouse owners towards producing organic products

Coefficient of Variation was utilized to prioritize the tendency of greenhouse owners towards any of the statements designated to quantify the attitude of greenhouse owners towards production of organic crops. Based on the results of this statistic as

presented in Table (3), the statements of “Changing the current method of agriculture, and converting to a form of organic farming”, “Tendency towards using natural fertilizers in place of chemical pesticides”, “Feeling of the necessity to cultivate in organic form (not using chemical fertilizers and pesticides)” grab

the first to third priorities respectively. Moreover, the average tendency of greenhouse owners towards producing organic products is 3.71, demonstrating the high tendency of greenhouse owners for producing crops in organic form.

Table 1. Personal and working characteristics of greenhouse owners

Independent Variables	Mean Value	Standard Deviation	Max Value	Min Value
Age	38	8	69	21
Working Experience (Year)	6	4	26	1
Area of greenhouse (m ²)	6989	2459	7000	1500

Table 2. Personal and working characteristics of greenhouse owners (extended)

Independent Variable	Variable Range	Frequency (persons)	Percentage	Cumulative Frequency
Education	Uneducated	0	0	0
	Read & Write	6	8	8
	Elementary	3	4	12
	Guidance School	4	6	18
	High school Diploma	21	30	48
	University Degree	36	52	100
Participation in the educational-promotional sessions on organic agriculture and drawbacks of chemical fertilizers and pesticides	Total	70	100	-
	No	30	43	-
	Yes	40	57	-
Secondary Occupation	Total	70	100	-
	Yes	28	40	-
	No	42	60	-
Irrigation System	Total	70	100	-
	Drip irrigation	49	70	-
	Rain Irrigation	21	30	-
Type of ownership	Total	70	100	-
	Privately owned	42	60	-
	Rented	17	25	-
	Communal	11	15	-
Criterion for using chemical fertilizers and pesticides	Total	70	100	-
	Decide by myself	27	39	-
	Based on the instructions from experts	16	23	-
	By asking other greenhouse owners	21	30	-
	Other	6	8	-
View of greenhouse owners towards organic agriculture	Total	70	100	-
	Bad or Negative	8	11	-
	Moderate	36	52	-
	Good or Positive	26	37	-
Acquaintance with organic agriculture	Total	70	100	-
	Very little	21	30	30
	Little	18	26	56
	Moderate	18	26	82
	High	9	13	95
	Very high	4	5	100

Table 3. Tendency of greenhouse owners towards organic production

Statements	Mean*	Standard deviation	CV	Priority
Changing the current method of agriculture, and converting to a form of organic farming	4.01	0.91	0.226	1
Tendency towards using natural fertilizers in place of chemical pesticides	3.57	0.89	0.243	2
Feeling of the necessity to cultivate in organic form (not using chemical fertilizers and pesticides)	3.45	1.02	0.296	3
Agree With farming in organic form (not using chemical fertilizers and pesticides)	3.21	1.08	0.336	4
Average	3.71			

* Very little: 1, Little:2, Medium:3, High:4, Very High:5

Table 4. Frequency distribution table of greenhouse owners with respect to tendency towards organic agriculture production

Score range	Assigned values of Tendency towards producing organic crops	Percentage
Score <12	Low	29
12 < Score < 16	medium	37
16 < Score < 20	High	34
Total	Low / medium / high	100

Table 5. Multiple regression results for the effect of independent variable of research on the dependent variables

Step	Independent Variable	Correlation coefficient (R)	Coefficient of Determination (R ²)	F
1	Being notified over the negative outcomes of using chemical fertilizers and pesticides	0.447	0.200	0.000
2	Contact with agricultural experts	0.589	0.346	0.001
3	Age of greenhouse owners	0.623	0.399	0.002
4	Participation in the educational-promotional sessions on organic agriculture and drawbacks of chemical fertilizers and pesticides	0.677	0.458	0.000
5	Education	0.693	0.480	0.000
6	Attitude towards organic agriculture	0.712	0.550	0.000
7	Acquaintance with organic agriculture	0.726	0.583	0.000
8	Experience in the greenhouse production	0.786	0.617	0.001

Table 6. The scale of effect from independent variables on dependent variable of research

Independent Variable	Name	Unstandardized coefficient B	Standardized coefficient B	t	Sig
Constant Variable	-	3.22	-	3.69	0.02
Being notified over the negative outcomes of using chemical fertilizers and pesticides	X1	5.66	0.41	10.10	0.00
Contact with agricultural promoters and experts	X2	4.69	0.36	7.52	0.01
Age of greenhouse owners	X3	6.65	0.33	6.21	0.00
Participation in the educational-promotional sessions on organic agriculture and drawbacks of chemical fertilizers and pesticides	X4	2.33	0.32	4.80	0.00
Education	X5	2.45	0.29	5.49	0.01
Attitude towards organic agriculture	X6	7.55	0.26	3.49	0.00
Acquaintance with organic agriculture	X7	3.52	0.17	2.21	0.03
Experience in the greenhouse production	X8	3.11	0.11	4.41	0.00

3.3 Frequency distribution of the tendency of greenhouse owners towards producing organic products

According to Table (4), in order to classify the tendency of greenhouse owners towards producing organic crops, scores of the statements in Table (3) were summed together producing minimum and maximum values of 4 and 20 at extremes, and subsequently re-codified as in three levels of low, medium and high, to study the attitude of respondents.

As seen from Table (3), greenhouse owners with high tendency towards organic production constitute 34% of the statistical population, whereas 37% of the greenhouse owners show medium attitude and 29% exhibit low tendency.

3.4 Determination of the factors affecting tendency of the greenhouse owners towards producing organic products

In this study, we used stepwise multiple regressions to determine the factors affecting the tendency towards expansion of producing organic crops. With stepwise method, in each step the most predictive variable is added to the regression equation and this process continues until the error of regression model significance test reaches 5%. In our investigation, the process of adding variables which demonstrated significant correlation with the dependent variable of research (tendency to produce organic crops), progressed up to the 8th step. Results obtained as in Table (6) indicate that in the very first step, the variable of "Being notified over the negative outcomes of using chemical fertilizers and pesticides" has entered to the regression equation. The value of multiple correlation coefficients (R) is 0.447, and the coefficient of determination (R²) is equal to 0.200. In other words, 20 percent of the changes in dependent variable of "tendency towards producing organic products" is explained by these variables. In the second step, "contact with agricultural promoters and experts" entered to the equation. Introduction of this variable to the regression equation, increased the values of multiple correlation coefficient (R) and coefficient of determination to 0.589 and 0.346 respectively, that is, 14% of the changes in dependent variable of "tendency towards producing organic products" can be explained by this variable. In the subsequent steps, six variables of "age of greenhouse owners", "participation in the organic related educational-promotional sessions on organic agriculture and drawbacks of chemical fertilizers and pesticides", "education", "attitude towards organic agriculture", "acquaintance with organic agriculture", and "experience in the greenhouse production" entered the equation.

According to the findings, these eight variables were able to explain 61.7% (R²=0.617) of the changes in dependent variable of "tendency towards producing organic products", and the rest of percentage is explained by other factors not identified by the researcher.

Furthermore, the scale of effect from independent variables on dependent variable of our research is presented in Table (6).

Based on the above comments and the results presented in Table (6), the linear equation resulting from the regression analysis is written as:

$$Y = 3.22 + 5.66 X_1 + 4.69 X_2 + 6.65 X_3 + 2.33 X_4 + 2.45 X_5 + 7.55 X_6 + 3.52 X_7 + 3.11 X_8$$

The significance of F and T tests indicate the significance of regression equation. Regression equation however, tells nothing about the relative significance of independent variables. To determine the relative significance of independent variables, we should investigate the value of Beta. This statistic reveals the exclusive effect of each independent variable on the dependent variable apart from the effects from other independent variables. In this context, the most important independent variable affecting the dependent variable of "tendency towards producing organic products" is the independent variable of "acquaintance with the negative outcomes of the excessive use of chemical fertilizers and pesticides", for which the value of Beta shows 0.41, that is, by each unit change in the standard deviation of "acquaintance with the negative outcomes of the excessive use of chemical fertilizers and pesticides" the standard deviation of dependent variable of "tendency towards producing organic products" undergoes 0.41 units of change.

4. Conclusion and recommendations

Development and expansion of organic agriculture and production of organic greenhouse products is considered as innovative, since innovation is an idea, method, or a subject which is considered as new by someone (Karami and Fanaei 2001). Therefore, assessment of the scale of greenhouse owners' tendency towards producing organic crops, as well as the identification of the factors affecting to elevate the tendency of greenhouse owners to expand the production of organic products, can also be very beneficial in recognizing the factors influencing the greenhouse owners to adopt other innovations. Moreover, identification of these factors reflects the parameters that influence the decision making of greenhouse owners, which in turn can be utilized by the authorities and policymakers for the introduction of other new products and agricultural innovations to the farmers. Hence, based on the findings from inferential statistics and researcher's direct visits to

the studied greenhouses, the following suggestions are proposed for the future research, in order to provide the grounds in the studied region for the development and acceptance of greenhouse organic products, and also to increase the greenhouse owners' tendency for moving towards producing organic crops:

Education and contact with information and communication sources, play important and effective roles in the tendency of farmers towards agricultural innovations, and organic agriculture is not an exception. In fact, as the regression analysis shows, "contact with agricultural promoters and experts", "participation in the organic related educational-promotional training sessions", and "acquaintance with the negative outcomes of the excessive use of chemical fertilizers and pesticides" are among the most influential factors in the tendency of greenhouse owners towards organic agriculture, which highlights the significant role of educational and promotional systems of agriculture as the major trustee in this field, in the advancement of agriculture in general and organic agriculture in particular. Therefore, it is proposed to put further focus on the educational and promotional activities of the studied region, as these activities as an agricultural information source can play an effective role in the elevation of tendency among greenhouse owners towards organic agriculture, by increasing the general knowledge about negative side effects of the conventional agriculture, and the positive outcomes of organic production.

Personal and working characteristics are also among the most influential factors in adopting agricultural innovations such as organic production. Based on the research findings and to elevate the tendency of greenhouse owners towards organic agriculture as well as to increase the success of organic agriculture development efforts, we suggest to primarily focus on younger greenhouse owners who possess higher levels of education and have positive views about organic agriculture. This approach, apart from lowering the costs related with organic production promotion and expansion efforts and further speeding its development, also provides an educational and demonstration farm for the other late-adopting farmers who are mostly elderly with lower formal education levels.

Agricultural experts and promoters retain an important role in increasing greenhouse owners' tendency towards producing organic agriculture. In fact, if any improvement in the views of greenhouse owners and the agricultural system is envisaged, it could only become possible through knowledge and information, and thus it is necessary to improve the practical and scientific skills of agricultural

promoters and experts through in-service trainings, seminars, conferences, etc.

In the third-world countries such as Iran, organic agriculture is yet young, and demand for organic products is still low. Therefore, it is necessary to increase the demand for organic products not only by culture-building via public media and education, but also through payment of subsidies to lower end-user prices (at least during the timespan of conversion from traditional to organic agriculture). This will not only promote the public health, but will also increase the confidence among producers of the organic products over the existence of a sustained market for organic products, and will reduce market and income risks, and eventually will raise the tendency towards organic production. The personal characteristics of farmers are one of the most important factors affecting the acceptance of agricultural innovations such as organic agriculture. According to the findings of the research, it is recommended that, in order to further develop the production of organic products, first, focus on younger farmers with high education that they have a positive attitude toward organic farming. Given that the production of organic products reduces an average of 20-25% of production, to provide income and economic justification for its production needs an increase in prices, which requires the differentiation between organic products and inorganic through the labeling of organic products. Considering that most of the greenhouse owners in the study area stated that they have not participated in the educational and extension courses related to organic agriculture and the use of fertilizers and chemical pesticides, and the reasons for their lack of participation were the low rates and costs. It has been suggested that professional organic farming courses to be held for introduce suitable methods for replacing and not using fertilizers and chemical pesticides.

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